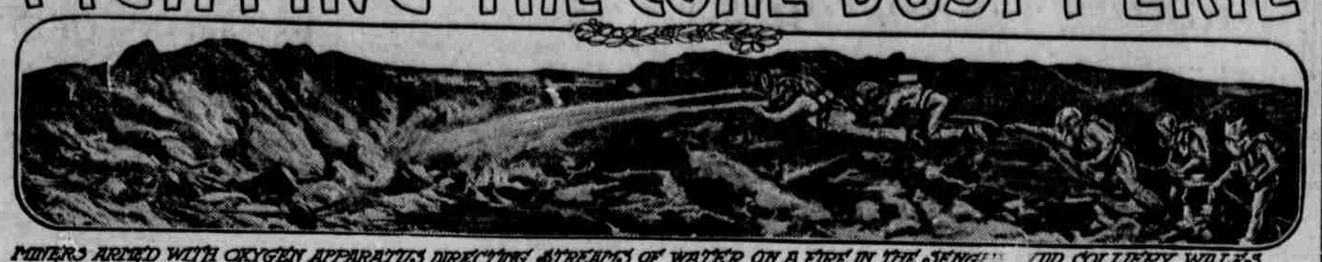
FIGHTING THE COAL DUST PERIL



MINERS ARMED WITH OXYGEN APPARATUS DIRECTING STREAMS OF WATER ON A FIRE IN THE SENGH... IDD COLLIERY, WALES

THE recent loss of life in the Sengh aydd colliery, Wales, affords another example of the explosive nature of coal dust. The public has heard a good deal about the dangers of firedamp and of its dreaded aftermath, chokedamp, which speedily overcomes its confused victims. Less has been said of the dangers of coal dust, but they are becoming better appreciated and measures to protect miners from them are being devised.

The bureau of mines at Washington has lately been doing good work in its studies of the explosibility of coal dust and in allied experiments seeking to find practical ways to lessen casualties from this cause. What American officials have done in this direction has been an amplification of similar efforts abroad. A surprising feature of the whole subject is that the danger lurking in this dust was so long unsuspected.

In fact, for many years people actually refused to recognize any menace in this material. It was not until convincing evidence was adduced by the scentific investigator that the stubbornness of generations gave way. Then unbelief surrendered before the indisputable proof of the dangers of coal dust when floating in the air.

According to the recent report of a British government committee, "it may now be considered established beyond all doubt that coal dust suspended in the air is capable of being ignited without the presence of any inflammable gas and of spreading an explosion throughout the dusty galleries of mines." The first requirement is that the dust shall be stirred up by some means and mixed with the air in cloud-like form. When ignited in this state it is capable of producing just such destructive effects as are so often observed after a colliery disaster.

Why is this stuff dangerous? Briefly, the chemists say that it is because there is more surface for the oxygen to attack, and this action induces heat. According to the British research commission, "the degree of inflammability of any combustible material can be defined as the relative ease with which its oxidation can be effected so as to produce flame." In other words, the finer the dust from any particular kind of coal the greater its inflammability.

The best evidence of this lies in the fact that a sample of coal which ordinarily would not ignite until it had been exposed to a temperature of 1,065 degrees centigrade would, when in the form of dust, explode at a temperature of 560 degrees centigrade. Gunpowder explodes at a temperature of 550 degrees centigrade, so you can see how closely coal dust is allied to gunpowder.

We have been burning coal for hundreds of years and /et there is a lot about it we do not know. In fact, the true chemical nature of this fuel rem ins largely a mystery. Investigators have sh wn that coal is not the simple substance i. was once thought to be. In fact, it is a compound of vegetable cellulose, which forms its base, cemented by the changed resins and gums of the primordial plants. The latter bodies are readily decomposed at comparatively low temperatures and it is from this part of the coal that the first of the explosive gases come. When coal is in the form of a dust it is in the condition to respond quickest to the action of heat.

You have seen the cloud of dust advancing along a country road ahead of a coming storm. Well, an explosion in a mine virtually duplicates this occurrence. The explosion sets up disturbing air currents and these stir up the coal dust in the outlying galleries. What follows? That initial blast heats the dust to the point of ignition and the fine particles mixed with the air become an explosive.

It flashes up at once and transmits kindred waves throughout the whole range of the dust cloud, and in this fashion generates a series of explosions which are successively fed by the whirling dust that they disturb. It is substantially a chain of explosions which lengthens to the furthest limits of the available fuel upon which it feeds.

The heedlessly bared flame of a miner's lamp may start the ball rolling, either by igniting a s small volume of firedamp or by setting off a cloud of coal dust which has been created by a miner's blast. Undoubtedly many of the worst colliery disasters have been more directly due to coal dust than to any other cause, and yet firedamp was until quite recently held responsible for most of these catastrophies. It did not occur to the miners or to their employers that the gathering particles of coal were a source of danger.

The operatives were too busy getting out merchantable coal to give any heed to the accumulating dust. And yet, as we have seen, the mine galleries were slowly but surely becoming little less perilous than magazines of powder.

Once the hazard was realized the mining world cast about for preventive agencies. Naturally the first remedy seemed to be water, and mine roadways were liberally saturated to lay the dust and thus prevent its rising so as to form an explosive mixture with the atmosphere.

In lieu of this the next precaution was in the form of dustless zones, the powdery particles being scrupulously removed for a considerable distance. The idea was to establish in this manner a sort of void through which expdosive waves could not be propagated. Theoretically this is all right, but again the ventilating air currents carry with them a measure of coal dust and make it impracticable to maintain the defensive zones.

Just how some one stumbled on the idea of diluting coal dust with a non-explosive dust is not a matter of history, but somebody did conceive the plan, and the value of this remedy is daily growing in favor because of its effectiveness. In general terms the German mine authorities touched upon this method as far back as 1884, but the subject was not brought forward scientifically until after the explosion in the Altofts colliery, England, two years later.

W. E. Garforth was the mine manager. While traveling through the underground workings after an explosion of coal dust he noticed that although great damage had been done in some places there were at others no perciptible destructive effects. Curiously, just at these apparently immune places fine stone dust had been whirled into the air with great violence and then settled upon the roadways like a thick carpet. Mr. Garforth noticed this peculiarity on other occasions and came to the conclusion that stone dust might be useful to dilute coal dust and so render the latter harmless, just in the same fashion as air is used to dilute firedamp.

A fine example of how well rock dust may be distributed by natural means is to be seen in the northern Illinois long wall field, where the bits of shale that fall from the roof and the pack walls keep the coal dust covered up. Explosions have never happened in this district, though mining has been going on there for over 40 years.

It took the British some years before they reached the point of action, but in July, 1908, experiments on a large scale with stone dust were commenced on the completion of the Altofs research gallery, Mr. Garforth being placed in charge. This gallery consisted of a tube 600 feet in length, having a diameter of seven and a half feet and being built of the shells of disused boilers, and for more than two years investigations were carried out with the most painstaking care.

It was proved conclusively that the admixture of an incombustible dust with the coal dust rendered the initiation of an explosion correspondingly difficult to effect. At the Woolwich testing gallery, the ordnance center of the British government, it was found that coal dust containing a large proportion of shale was insensitive to ignition by means of a charge of gunpowder. In these latter experiments sensitive coal dust was rendered inert by an admixture with 85 per cent. of shale dust. But this seemed to call for too much protective stone dust to make the method practicable.

The Belgian authorities have set the pace in this matter. They did it by placing boards in the mine galleries just under the roof in the form of sheives and upon these they laid heaps of incombustible dust, not fine enough to be disturbed by the normal air currents. They allowed something like nine bushels per square yard of working.

There was left sufficient space above the top of the dust heap for the blast of an explosion to sweep over the pile and thus to blow it broadcast in a cloud. Thus the same destructive blast that would otherwise have stirred up the coal dust and ignited it was made to set in motion an antidote which smothered the inflammable particle of coal.

European experiments have shown that a 40 per cent. admixture of stone dust with coal dust was sufficient to prevent an explosion. Of course this depends upon the chemical nature of the coal, and the results so far obtained are the reward of the first efforts to lessen this hazard. It is quite probable that some kindred but less bulky medium will be discovered that will answer better. In fact a 2 per cent. mixture of sodium bicarbonate has a very remarkable smothering or checking effect.

VIEW SHOWING THE ATTACK ON THE SENGHENYDD FIRE WITH SANDBAGS AND TURF

INSIDE INFORMATION ON CONDUCT OF THE FIGHTING AROUND TAMPICO

Correspondent at City of Mexico Sends Inside Details of Battle at Mexican Port and Tells of Attitude of Huerta Administration Toward Foreign Correspondents — Constantly Threatened With Deportation.

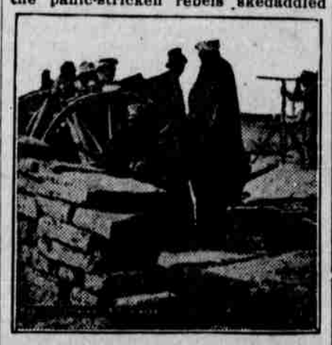
It is seldom that a correspondent in the City of Mexico finds opportunity to smuggle "copy" or manuscript out of the country telling the truth about the government. To be caught in this act would bring dire and disastrous consequences, the least of which would be arrest and expulsion from Mexico. In the following article a Mexico City correspondent gives some inside details of the Battle of Tampico, and tells of the attitude of the Huerta administration towards foreign correspondents.—Ed.

City of Mexico.—Foreign correspondents in Mexico have been threatened with deportation as "pernicious foreigners," as provided in article 33 of the constitution of the United States of Mexico, if they do not mend their ways and desist from sending out

Tampico Customs House, One of Main Points of Attack by Rebels.

false news, as it is alleged they have been doing. As a matter of fact, the foreign correspondents now in Mexico have been at great pains to secure and send out the truth, the whole truth and nothing but the truth, and that is just where the shoe pinches. It is well understood among the correspondents that any news of rebel successes, of financial near-panics, of business depression, of federal losses, of anything not wholly favorable to the government, will be denied by the government, and, consequently, branded as "false news." So any correspondent caught sending out such facts is liable to be adjudged a "pernicious foreigner" and sent out of the country for the country's good.

A striking example of the difference between the news as officially provided by the Mexican government and the real news—that is, the truth—is that of the attack of the Carranzistas on Tampico in December, that was done there and the final withdrawal of the rebels. The official reports, for publication in the local press and for the use of foreign correspondents, told in detail how several thousand Carranzistas attacked the city from the 10th to the 13th of December, fought like demons trying to take it, and finally were repulsed by the well-directed artillery fire of the batteries in the city, assisted by the cannonading from the gunboats. It told how the panic-stricken rebels skedaddled



Federal Troops Defending Tampico.

towards the north, closely pursued by the federal cavalry and how when night fell December 13, fully 1,800 rebels lay dead along the route of their flight. One account, sent out by a gullible correspondent, stated that "the buzzards which inhabit the Mexican coast and which for generations have been protected by law, floated today over the battlefields in numbers so great as to present the appearance of low-lying black clouds." Which prompted another correspondent to remark that the "low-lying" was all right, but he doubted the buzzards and the black clouds, for as a matter of fact, it is well known that the buzzards won't eat dead Mexicans, and you can hardly blame them.

General Arzamendi, one of the federal commanders at Tampico, said later that the reports placing the number of rebels killed in the attack at more than 1,000 were not exaggerated, as he saw piles of 50 and more rebel corpses in many places on the battlefield and that at least 1,500 were wounded. These statements were made for the newspapers and were published with big headlines here.

From several Americans who were within the rebel lines, during the battle, but who took no part in the engagement, and had no interest in it except as spectators, another story is obtained. These Americans are connected with various oil companies in Tampico and may be considered impartial witnesses. Their stories were obtained at different times and agreed wonderfully well.

According to these men who were on the ground and saw all that went on, not more than 500 Carranzistas were engaged in the attack on Tampico from start to finish. Their losses for the three days were seven men killed and 43 wounded! The federal losses were 83 killed and 211 wounded.

"I was at one of the oil refineries in Dona Cecilia on the morning of December 10, when the attack began," said one of the oil men to the writer. "Two hundred and fifty cavalrymen rode out from Tampico that morning and stopped at the refinery to eat their breakfast. It was about nine o'clock when they were eating and they were about half through breakfast when two of their men who had been sent out to watch for rebels came back on the dead run, shouting that the rebels were coming. The two men never stopped a moment, but dashed on towards Tampico. Instantly those 250 cavalrymen were going for their horses and mounting and as fast as they mounted they went off helter-skelter for Tampico. In less than two minutes not one was left at the refinery.

"Fifteen minutes later 20 Carranzistas under General Castro came riding in. They had their carbines resting over the pommels of their saddles and were looking about keenly for federals, but they were not in any formation. They simply straggled in. When they reached the refinery they asked if any federals were about. We told them that the federals had gone to Tampico. So they dismounted and ate their breakfast, using some of the food which the federals had left behind in their haste to get away.

"While they were eating they heard the whistle of a locomotive and saw a train, loaded with refugees, coming from La Varra to Tampico. General

Where Tampico Refugees Embarked to Board U. S. Warships.

Castro called to one of his men, a little fellow about five feet tall, a dried up little Mexican who I learned later was from Texas, and told him to go over to the station and stop the train. The station was about 500 feet away. The little Texas-Mexican jumped on his horse and trotted to the station. He reached there just as the train was pulling in. He pointed his rifle at the engineer and told him to stop. The engineer stopped and started to back the train, but the little rebel wouldn't have that. He made the engineer stop the engine and get out of the cab. By that time all the passengers were piling out of the train and getting away as fast as they could in every direction. There were nine federal volunteer guards on that train, but they left their rifles and cartridge belts and their uniform caps in the cars and got away with the passengers as fast as they could. The conductor and other trainmen escaped, too. Finally General Castro sent two or three other men over to the station and they got on the train and made the engineer run it into the yards. Then they held him for further use. Later on they employed him in helping to shift cars in the yards and make up trains.

"When the rebels left Dona Cecilia December 13, they took seven locomotives, six tank cars of fuel oil, four tank cars of water, four cars of dynamite, three cars of black powder, three of corn, one of shoes and a good many passenger coaches and empty freight cars. They had picked up about a thousand peons in Dona Cecilia and the neighborhood and made them go and repair the track for 30 kilometers. Then they brought the men back and turned them loose.

"I saw the cannonading from the artillery and the Mexican gunboats. It kept up for three days, but in all that time not one shell landed near enough to the rebels to do any damage. Several shells from the Mexican gunboats fell in the federal trenches, however, and killed and wounded the 'volunteers' who were lying there, in some instances chained together to keep them from running away.

"The rebels under General Castro only executed one man. He was Chief

Rebels Storming Outposts of Tampico.

of Police Alcala of Dona Cecilia. He had been very active in arresting rebel sympathizers and so when the rebels came, they took him and executed him as a warning to others. General Castro sent that same little dried up Texas-Mexican to take the chief of police. The little rebel went to the chief's house and found it locked. The chief was rolled up in a mattress. The little rebel had to hit him over the head with the handle of a six-shooter, for the chief made a little resistance, but he was taken easily enough. That night he was shot on the plaza.

"When General Castro told me December 13 that he was going away with his men I was surprised.

"'Why, what is the matter?' I asked. 'You haven't been defeated, have you?'

"'No,' he said, 'we haven't even had a real fight; but we have all we came for and so we are going away. We may come back again before a long time and take the city, if we want it, but that depends on orders from Carranza.'

"Two messengers came to General Castro while the shooting was going on. They were sent by Admiral Fletcher with a letter. The letter quoted a clause from The Hague arbitration tribunal agreement that 24 hours' notice must be given before a city may be bombarded, according to civilized warfare. It also said that there must be neutral ground where the non-combatants could gather in safety, and suggested that the main plaza of Tampico and a radius of two blocks from it be considered such ground. It further said that foreign property must be respected and not fired upon.

"General Castro had the letter translated, although he can read English. Then he answered it, saying that as the United States did not recognize the revolution, he did not feel bound by rules of civilized warfare and would use his own judgment what to do. He added, however, that Carranza had given instructions to respect foreign property as much as possible, and that he would respect those orders."

After a story like the above, told in plain, direct fashion by an impartial witness, and backed up by others who were on the ground, it is pretty hard to picture that battlefield strewn with a thousand rebel corpses and with "low-lying black clouds of vultures hovering over it."

A SCHOOL FOR BRIDES

New York East Side Innovation Which Has Proved a Wonderful Success.

Could anything be more practical than a little three-room flat outfitted as a model home, the whole affair being use as a school for brides? St. George's church—picturesque old landmark of Stuyvesant square—has opened such a school, with two sessions a day, says the New York Mail. And maybe it isn't a success! Also, maybe it is.

Mrs. Herbert Satterlee, daughter of the late J. P. Morgan, presented the school to St. George's Memorial house through the city mission committee of the church, which is composed of women as kind as they are wealthy.

It was intended for "children more than twelve years old," for it is the children of congested East side neighborhoods who are the teachers of their parents when it comes to matters of modern household art.

Older girls heard of it, however, and clamored for admission to the classes. New little brides heard of it and, longing to start their married life aright, also clamored. Now, Miss Jessie McCutcheon says, the school threatens to outgrow its allotted space and spread all over the neighborhood.

Miss McCutcheon, from Edinburgh, Scotland, is the teacher. In a blue gingham house frock and white cap that hides a mass of wonderous gold hair, she puts her pupils through the daily duties of a "three-room" household and incidentally feeds them a jolly good meal.

Everything in the three rooms could be bought for $100. Yet they are perfectly and sanitarily furnished and illustrate a comfortable home for a small family.

One bedroom has a double deck bed. Here four tots can sleep comfortably, two by two, laid scrupulously head to feet. There is a crib, too, for there's always a baby.

A chiffonier contains all the children's clothing and they are taught to keep it there. In a corner is a homemade closet with gay chintz curtains and a pine shelf a foot from the floor for shoes. On top sit a row of pasteboard millinery boxes resplendent in wall paper overcoats, and as ornamental as you please.

Cleanliness is dinned into the pupils and the joys of washstand and the toothbrush emphasized. "There's a place for everything," is the slogan, and every student heeds it.

The living room contains a couch dressed in gay chintz by day, but opening double at night by a single twist of the wrist. Another curtained wardrobe is in this room, for ma's and pa's best clothes, with the usual shoe shelf. The chairs are of white pine of the common or 75-cent variety, grandly stained with brown, which cost only 50 cents a can and was enough to stain chairs, table, shelves and floor.

In the kitchen everything is scrubable. Five-cent fruit jars serve as holders for cereals, sugar, flour, dried peas, beans, etc. On the window sill is a "cold weather refrigerator" made of a box with an oilcloth curtain.

All windows of the flat are curtained in snowy cross bar muslin, cheap, pretty, durable and easily kept clean. At top of the windows is a plaited frill of six-inch blue checked gingham and it is amazing how stylish it looks.

The whole place is spick and span and as fascinating as a newly furnished doll house.

Each room is the basis of a lesson. Miss McCutcheon drills her classes first in the making of coffee and toast, and the preparation of a cereal, for breakfast. Then comes the airing and tidying up of the "living room," which is made completely ready so that there will always be one spot where company can be received, no matter how soon it may be after breakfast.

Then the children's bedroom is tackled. After that the scene of operations is in the kitchen. This interests the pupils most of all.

Simple but nutritious dishes are prepared. Stew is a favorite; also potato soup, bread pudding, custard, rice cakes, prunes and boiled apricots.

Plain, cheap fare, easy cooked and to digest, is the order of the model kitchen, and little Scotch Miss McCutcheon manages to put many a nugget of useful philosophy into her household lessons.

"Is it all appreciated?" she exclaimed, in reply to a query. "Well, I should say it was. It's almost pathetic to see how eager the East siders are to learn good living. They fairly drink in the lessons, and a trip through the neighborhood would soon prove to you that they profit by every word. I believe any bride who modeled her home after this three-room flat would be assured of a happy and prosperous married life!"

HOW NAPOLEON DIED

Additional Particulars Given by Grandson of Medical Attendant.

Some interesting additions to the last chapter in the life of Napoleon—the five and a half years he spent on the island of St. Helena—are made by L. M. Shortt, the grandson of Dr. Thomas Shortt, who was principal medical officer on the island during the last months of Napoleon's life, says London Tit-Bits.

Two months before the death of "the little Corsican," which took place about ten minutes before 6 o'clock on the evening of May 5, 1821, Napoleon was told that a splendid mansion had been completed for him on the island, to which he could move at any time. Napoleon, however, regarded the building with horror, and would never go into it. Dr. Shortt, and those obliged to be on the spot, had beds in the mansion, being its first inhabitants.

Napoleon developed many eccentricities before his death. It was with the greatest difficulty that he could be persuaded to take either food or medicine. Indeed, Dr. Shortt had to invent a plan to make Napoleon take medicine without his knowing it.

By this means the doctor managed to give him ten grains of calomel, and he derived advantage from the medicine, but his strength declined rapidly and his existence soon terminated. Dr. Shortt mentions, in the English Review, that Napoleon would allow no stranger to approach him, and, although he continued in consultation until Napoleon died, he did not see him until after his death.

A post-mortem examination revealed the fact that Napoleon's body was a perfect mass of disease from cancer. His father died when younger than himself of the same disease, so that it was hereditary and unconnected with climate or the mode of life he led at St. Helena. There is little doubt that he would have shared the same fate had he been seated on the throne of France. It is said that Napoleon's sister, the Princess Borghese, suffered from the same disease, and Bonaparte was anxious that his own symptoms should be fully ascertained for the purpose of being useful to his child, who might inherit from him the complaint.

WISCONSIN'S FIRST EUGENIC COUPLE

Irwin Maxwell Gregg and Grace Margaret Knoll were the first man and woman to be married under the new eugenic law of Wisconsin, which requires that every person entering matrimony have a physician's certificate of good health. Mr. Gregg is director of the Milwaukee Y. M. C. A. and his bride is an all round athlete.

Physics of the Emotions

The exaltation of victory makes wounded soldiers oblivious of pain, and the depression of defeat increases mortality. If a cat is frightened for ten or fifteen minutes by a barking dog, a sample of its blood will make strips of certain muscles relax when they are immersed in it, though such a portion of blood had no effect on them before the emotional disturbance. Frightened rabbits show almost complete prostration, and their brain cells, in contrast with those of normal animals, take a deeper stain from certain chemicals, and their size and shape are strikingly altered. Finally, if an individual is placed in circuit with a delicate galvanometer and made to laugh, to feel sad, or is suddenly surprised, there ... Dr. Hoffman was slippery a... ments in the instrument indicating the passage of small electric currents. Such interesting scientific facts as these, and many others, make it clearly evident that emotions are something more than mere states of mind. Fred W. Eastman, in Harper's Magazine.

Too Significant an Appeal.

A retired naval officer became the rector of a country parish. His parishioners ... to give him a surprise ... themselves and bought a flag for the church tower. Directly the old gentleman saw it he flew into a violent rage, and ordered it to be taken down at once. One of his parishioners asked him why he did not like it. "Allow that flag to fly on my church tower!" he raved. "Never! It's an insult. Do you know what that particular flag signifies, sir? It means 'In distress; want a pilot.'"

Panama sends about 5,000,000 cocoanuts a year to the United States.

MAN IS SAVED FROM WOLVES

Pennsylvania Girl Visiting Relatives in Wyoming Rescues an Imperiled Hunter.

Latrobe, Pa.—Going to the aid of a man who had been trapped in a cave by a pack of timber wolves, Miss Marie Louise Walker of Latrobe, who is visiting relatives in Wyoming, stood off the attack of the wolves and drove them away with a rifle, according to a story received here. Eleven of the wolves were killed before the pack beat a retreat.

Miss Walker, who was spending her vacation at the ranch, heard the howling of the wolves while hunting. She dismounted from her horse when she neared the cave around which the wolves had gathered, and the mount took fright and galloped away. The man in the cave was T. Adolph Van Camp of Chicago, who had become lost in the darkness while tracking deer the night before and had taken refuge in the cave from the wolves.

The hunter had been nearly frozen from exposure during the night and was assisted by Miss Walker to a nearby deserted miner's cabin. The girl then tramped three miles through the snow to the nearest ranch and summoned medical aid. It was feared at first that Van Camp would have to have both feet amputated on account of the freezing.

Miss Walker has the pelts of five of the wolves she killed and that were not devoured by the pack.